result from the junction of two main streams flowing to the south of Sardinia and the north of Corsica respectively.

Many disputed questions are discussed by the authors of the papers in this report, and we await with interest the results of the biological investigations. There is no doubt that the fishes and other groups of animals inhabiting the Mediterranean area are still imperfectly known; while the investigation of the pelagic microscopic life of these seas is one which is full of interest. A good deal of such work has, of course, already been done, but the results of investigators thoroughly familiar with deep-sea work of this kind in the northern seas are sure to be interesting, and the comparisons which we may expect they will attempt ought to throw new light on many questions of general biological interest. J. J.

THE GUM TREES OF AUSTRALIA.[1]

MR. T. H. MAIDEN, the director of the Botanic Gardens, Sydney, N.S.W., published the first part of his great work on the characteristic Australian genus Eucalyptus in 1903, and it has now reached the seventeenth part. There is no other country of the same extent as Australia in which one genus of trees largely predominates throughout and, at the same time, has few extensions beyond. It has been estimated that three-fourths of the forest vegetation of Australia consists of gum trees and bushes, yet the genus is not represented in the native flora of New Zealand, New Caledonia, Lord Howe Island, and other contiguous countries, including, I believe, New Guinea, though *E. alba* is a native of Timor.

But, like Baeckia and Melaleuca, other myrtaceous genera, Eucalyptus has a considerable northward extension in eastern Asia, limited, however, to one species the present distribution of which is peculiar. Mr. Maiden has succeeded in showing that this species, *E. naudiniana,* abundant in Neu Pommern (New Britain), is the same as that discovered in Mindanao, Philippines, by the United States Exploring Expedition (1838–42), and described under the name multiflora—a name previously occupied. These two localities are separated by about 13° of latitude and 25° of longitude, or, approximately, 1500 miles, and hitherto *E. naudiniana* has not been recorded from any intermediate locality. Its presence in the Philippines is an interesting fact in phytogeography, and the question arises, Is it a straggler of a southern migration, or is it, and similar outliers, a northward extension of a type of southern origin? But this is not the place to discuss the point.

So far Mr. Maiden has described and figured ninety-four species of Eucalyptus, and given all details available of their distribution, based on practically all the important herbarium material in existence, and a very wide personal experience in the forests of all parts of the country. Upwards of one-third of these ninety-four species are of later date than Bentham's "Flora Australiensis," or were not given specific rank by Bentham. From a rough calculation the number of valid species of Eucalyptus will not be fewer than 150; some generally dispersed, though the western species are mostly different from the eastern, and many of them bear more conspicuous flowers than the eastern. Others are very rare and near extinction, notably the very large-flowered, shrubby *E. macrocarpa.* It is to be hoped that Mr. Maiden's health and official duties will permit him to bring this valuable monograph to a relatively early conclusion, as it is only in the complete form that it can be fully useful.

W. BOTTING HEMSLEY.

NOTES.

WE are informed by Dr. H. Mohn that he has resigned the professorship of meteorology in the University of Christiania and the directorship of the Meteorological Institute of Norway. Mr. Aksel S. Steen has been appointed to succeed him in these positions.

AT the time of going to press with our issue of last week, the race by Mr. H. G. Hawker in an all-British waterplane for the 5000*l.* prize offered by *The Daily Mail* was in progress. The distance to be covered was 1540 miles, and of this 1043 had been accomplished on Wednesday when, according to the aviator, his foot slipping off the rudder bar, he lost control of the machine, which fell into the water of Lough Shinny, Ireland, and was wrecked. Mr. Hawker and his companion, Mr. Kauper, were rescued, the first-named uninjured, but the latter with a broken arm and other injuries. Although the task set him to accomplish was not fulfilled, the aviator must be congratulated upon having made a very satisfactory series of flights. The machine, fitted with a Green engine, was built by the Sopwith Aviation Company, and was a biplane with a span between the wing tips of 50 ft., and a length of 31 ft. 6 in. It had two main floats, with single hydroplane step, each weighing 170 lb., and also a small torpedo float under the tail. The total weight of the machine and passengers was estimated at 2400 lb.

THE next International Conference on Cancer (the fourth) is to be held at Copenhagen in 1916.

ACCORDING to the *New York Medical Journal,* an International Exposition of Safety and Sanitation will take place in New York in December next. It will include exhibits devoted to safety, health, sanitation, the prevention of accidents, the welfare of the public and the individual, and the advancement of the science of industry. Exhibits from foreign countries will, by a special Act of Congress, be admitted free of duty.

A REPORT from Vienna states that a ship has been purchased for an Austrian expedition to the South Polar regions, and that funds are being collected in aid of the object. The expedition is to be under the leadership of Dr. F. König, of Graz, and the proposal is that it shall leave Trieste in May next. A large donation to the funds has been given by the Austrian Academy of Science, and the Austrian Geographical Society has promised an annual subsidy towards the cost of the undertaking.

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[1] "A Critical Revision of the Genus Eucalyptus" By J. H. Maiden, Government Botanist of New South Wales. Parts xii–xvii. Plates 50–76, with descriptive letterpress. (Published by Authority of the Government of the State of New South Wales, 1910–13.) Price 2*s.* 6*d.* each part.

MR. D. A. BANNERMAN has returned from a zoological mission to the eastern islands of the Canary group, undertaken with the object of procuring examples of the birds of these islands for the Natural History Museum. The islands visited were Fuerteventura, Lanzarote, Graciosa, Montana Clara, Roque de l'Oueste, and Alegranza, several of which had not previously been visited by a collector. Mr. Bannerman succeeded in obtaining a number of rare and interesting species peculiar to the islands, while the fact that the birds were collected in their breeding plumage renders them of special value to the museum bird room. On Alegranza a new species of chat was discovered.

REFERENCE was made in our last issue to the three educational museums which were founded and equipped by the late Sir Jonathan Hutchinson. We regret to learn from *The Times* that the future of these institutions is in an uncertain state and causing anxiety to those who have been privileged to make use of them. So far as the museum of Haslemere is concerned, there is a strong feeling in the town that everything should be done to retain the institution, and it is understood that the family are willing to hand it over to a responsible committee or body of trustees so that the museum may be placed on a permanent and public basis. The annual cost of maintenance on the present lines is about 400*l.*, and an appeal will shortly be issued with the hope of securing this sum for five years at least, it being thought that by that time those who are interested in the matter will have had an opportunity of deciding what are the best steps to be taken for the permanent control and maintenance of the museum.

As was stated in our issue of July 3 last, plans are being prepared for the new buildings to be erected at the Rothamsted experiment station in commemoration of the centenary of the birth of Sir John Lawes and Sir Henry Gilbert. We now learn from the *Journal* of the Royal Society of Arts that strong committees are being formed to raise the necessary funds for the memorial. It is stated that the sum of 12,000*l.* is required, and of this amount half will have to be raised by public subscription, the remaining half being obtainable from the development fund.

A TABLET was unveiled on Sunday last at Primiero, Southern Tyrol, on the house in which Alois Negrelli was born, to commemorate Negrelli's work as surveyor of the Suez Canal. He began his investigations in 1847, completed his plans in 1855–6, and in 1858 was appointed inspector-general of the Suez Canal works. He died on October 1 of the latter year.

WE note, with regret, the death, at the age of sixty-six, from typhoid fever, while on his voyage home from the Philippines, of Dr. Tempest Anderson, who for a time lectured on volcanoes at the Royal Institution. He was joint author of the report to the Royal Society on the seismic disturbances in the West Indies in 1902 and 1907, and had filled, among other positions, those of president of the Yorkshire Philosophical Society and the Museums Association.

THE death is announced, at the age of sixty-six, of Col. Andrew Clark, a gold medallist of the British Medical Association, lecturer on surgery at the Middlesex Hospital Medical School, and author of the "Middlesex Hospital Surgical Reports, 1872–4," and of "Ambulance Lectures." He also edited the fourth edition of "Fairlie Clark's Manual of Surgery."

IT is stated in *The Allahabad Pioneer Mail* that the Maharaja Scindia of Gwalior is giving special attention to the valuable archæological relics and treasures in his State, and is taking steps to create an archæological department in Gwalior. In furtherance of this object he has sought the advice and cooperation of the Director-General of Archæology in India.

ACCORDING to *The Scientific American*, a large naval radio station is shortly to be constructed by the United States at Caimeto, Panama, to be known as the Darien Radio Station. It will consist of three towers, each 600 ft. in height. The bases of the towers will be 180 ft. above sea-level, and they will be arranged in a triangle measuring 900 ft. on each side. The sending and receiving radius will be about 3000 miles direct reach to the Arlington Station, to San Francisco, and to Valdivia, 420 miles south of Valparaiso, on the Pacific, and Buenos Aires on the Atlantic. It will cover a vessel anywhere on the east coast of the United States, and communicate with St. Vincent. The system to be used is the Poulsen.

NEW lightning conductors have been installed on St. Paul's Cathedral. In the course of the operations part of one of the original iron bar conductors erected more than 140 years ago under the supervision of Benjamin Franklin was discovered. This bar, having been inside one of the towers and so not exposed to the weather, was still in a good state of preservation. *The Times* recalls that the fixing of these "Franklin rods," as they were called, led to a heated controversy as to whether lightning conductors should have points or balls as terminals. The president of the Royal Society, who advocated points, had to resign. King George III. was a strong adherent to ball terminals.

IT is announced in *The Times* that a discovery of oil shale has been made in the island of Skye by Dr. G. W. Lee, a member of the scientific staff of the Scottish Geological Survey and Museum, Edinburgh, who was examining the geological structure of the east coast of Skye. The extent and value of the deposits are not yet fully known, but it is stated that the seam discovered is about 11 ft. in thickness, that it extends over a considerable area, and that, although not of first-class quality or so good as the seams worked in the Lothians, it is likely to prove sufficiently good to be worked successfully, in view of the improved methods of operation now followed by the leading shale oil firms.

THE droughty summer has closed with some exceptionally heavy rainfalls over the south-eastern portion of England, where the rains for the last two or three days of August have materially modified the aggregate measurements for the season. At Greenwich the rainfall for the three days, August 29 to 31, was 1·22 in., which is more than the total for the preceding part of the month. Without the rainfall for the last three days of summer the total for the three months at Greenwich would have been more than an inch less than for the corresponding season in the abnormally fine year 1911. The total rainfall for the summer at Greenwich is 4·69 in., whilst in 1912 it was 7·86 in., and in 1911 it was 3·72 in. The driest summer of the last seventy years occurred in 1864 with 2·50 in., and in the last fifty years there have been fourteen summers drier than the one which has just closed. At Greenwich the summer rains this year are 70 per cent. of the average. In places the recent rains have not had much influence on the total for the summer. At Jersey the summer rains, June, July, and August, are only 28 per cent. of the average; at Leith, 40 per cent., where until August 28 they were only 28 per cent.; at Valencia, 51 per cent.; and at Liverpool, 66 per cent. The mean temperature for the three months at Greenwich was 61°, which is in precise agreement with 1912, and 5° cooler than 1911. The sunshine this summer was 442 hours, in 1912 it was 497 hours, and in 1911 it was 819 hours.

THE proceedings of the third meeting of the General Malarial Committee of the Government of India, held at Madras during November, 1912, have been published recently as a substantial volume, which contains much interesting reading and affords evidence of a great deal of energetic and enthusiastic research upon the etiology of disease in India. The papers and discussions reported cover a wider field than the title indicates. Several papers deal with the question of *Stegomyia fasciata,* the mosquito known to be the carrier of yellow fever in the New World; in view of the approaching opening of the Panama Canal, when the endemic home of yellow fever will be brought into closer communication with the Far East than it is at present, the degree of prevalence of this mosquito in the ports of India is likely to become a matter of urgent practical sanitary importance. Other papers read dealt with the vexed question of the transmission of Kala Azar. Capt. Patton, who regards the parasite causing this disease as a member of a group of Flagellates primarily parasitic in insects, has observed developmental stages of the parasite in the common bed-bug, but as yet no satisfactory experimental proof that the bed-bug transmits Kala Azar has been brought forward, nor has the existence of any "reservoir" of the disease in domestic or wild animals been demonstrated. The problem of Kala Azar is, however, under investigation by a number of competent workers, and its solution in the near future may be confidently expected.

THE Australian Institute of Tropical Medicine has issued its report for the year 1911 (more correctly for the year ending March, 1912). The bulk of the report is written by the director, Dr. Anton Breinl, and contains important investigations dealing chiefly with parasitic worms and Protozoa, illustrated by eleven excellent lithographed plates. Especially noteworthy amongst these researches is an investigation into the morphology and life-history of *Onchocerca gibsoni,* the nematode parasite which causes the so-called worm-nodules in Australian cattle. A number of experiments were recorded which were directed towards solving the problem of the transmission of this parasite, but up to the present these experiments have not led to any conclusive results as to the intermediary host of the worm. Appended to the director's report is that of the entomologist, Mr. Frank H. Taylor, and a report on the Cestoda and Acanthocephala of North Queensland, by Dr. T. Harvey Johnston. The entire report makes a quarto volume of 96 pp. and 17 plates, neatly bound in cloth, but having one defect from the point of view of the bibliographer, namely, that there is nowhere any indication to be found of the date of publication, whether 1912 or 1913. This is an unfortunate omission in a work which describes numerous new species of animals, including even a new species of Cyclops.

IN a recent number of the Annals of Tropical Medicine and Parasitology (vol. vii., No. 3A), Dr. J. W. Scott Macfie gives an account of a new species of trypanosome observed in human beings in Nigeria. It occurs most commonly in young people, and produces a mild form of sleeping sickness in which the trypanosomes cannot be found in the peripheral blood, but are present in the lymphatic glands. To the smaller experimental animals of the laboratory the trypanosome appears to be but slightly pathogenic. In the blood of the guinea-pig the trypanosome is smaller than *Trypanosoma gambiense;* like that species it is polymorphic, with long and slender, short and stumpy, and intermediate forms, and a few minute trypanosomes, measuring as little as 8 μ in length, appear constantly in the blood-films. Some of the short, stumpy forms have the principal nucleus situated far forwards at the anterior (flagellar) end of the body. Forms in which the flagellum appears to be free from the body for its whole length are also found. The Nigerian trypanosome is regarded by Dr. Macfie as a species distinct from *T. gambiense,* and is given the name *T. nigeriense.*

IN part 6, vol. iii., of the Journal of the East Africa and Uganda Natural History Society, Mr. C. W. Hobley discusses, from an examination of weapons used by the Pygmy and other neighbouring tribes, the question of the evolution of the arrow. He comes to the conclusion that the use of the stone point is later than that of the thorn; hence, that the use of poison applied to the tip is probably older than is commonly supposed; the lateral barbs were suggested by some of the many thorny-stemmed plants which flourish in the bush in which the hunter lived. He suggests that the aboriginal tribes of the centre of the continent passed direct from the use of natural thorns to the use of iron points, but the people east of Lake Victoria began with natural thorn points, passed through an age in which stone arrow-points were used, and eventually passed into an iron age, the variation in development depending on the absence or presence of suitable stone for making arrow-points. The wooden point still survives, but only sporadically; the stone point has disappeared, but the leaf-shaped iron point used by some of the Kavirondo, Nandi, and also found among the Tharaka, is undoubtedly a copy of the leaf-shaped stone arrow-head, of which good examples are now coming to light.

THE possibility of the existence of some hitherto *unidentified* animals in Central Africa is again raised in a communication by Mr. C. W. Hobley, published in part 6, vol. iii., of the Journal of the East Africa and Uganda Natural History Society. One of them is described as possessing "thick, reddish-brown hair, with a slight streak of white down the hindquarters, rather long from hock to foot, rather bigger than a hyena, with largish ears." Some naturalists are inclined to identify it with the hairy ant-bear, Orycteropus; but most of those who have seen it are well acquainted with the ant-bear, and it is an almost unique phenomenon for an ant-bear to be seen abroad in daylight. The natives, again, have tales of a lake monster which the Baganda call Lukwata. Europeans have seen a strange beast swimming in the Napoleon Gulf, which was apparently not a crocodile. An American sportsman, E. B. Bronson, saw on the Gori River, Lake Victoria, a beast "14 to 15 feet long, head as big as a lioness but shaped and marked as a leopard, two long white fangs sticking down straight out of his upper jaw, scaled like an armadillo, back broad as a hippo, spotted like a leopard, and a broad, fine tail; the imprints of its feet were as large as that of a hippo but clawed like a reptile." Another monster has been seen by natives "as large as a man, sometimes going on four legs, sometimes on two, in general appearance like a huge baboon, and very fierce." Naturalists will await with interest the discovery of specimens of these strange animals.

BEFORE the publication, in *The Philippine Journal of Science* for April last, of Mr. H. O. Beyer's paper on origin myths among the mountain peoples of the Philippines, no representative collection of Philippine myths had been made. Until recent years it was believed that all ancient records written in the syllabic alphabets which the Filipinos possessed at the time of the Spanish conquest had been lost; but two of these alphabets are now found in use by wild tribes of Palawan and Mindoro, and ancient manuscripts written in the old Bisaya character have recently been discovered in a cave in the island of Negros. These still await publication. Mr. Beyer's paper is based on oral tradition and gives a large collection of interesting legends, including an underground death-land, a story of the Atlas type, in which the world is supported by a post created by the chief deity and near which he dwells, and a remarkable flood myth current among the Central Ifugaos. It may be hoped that Mr. Beyer will continue his researches in the new folklore area.

MR. T. SHEPPARD, curator of the Municipal Museum, Hull, has issued a fourth edition of his catalogue of the collections under his charge. This is rendered necessary by the process of rearrangement which followed important additions to the collections, and the establishment of the new Wilberforce House Museum and the Pickering Museum of Fisheries and Shipping, which has done much to remove the pressure on the original buildings. Wilberforce House, built for the Lister family, about the end of Queen Elizabeth's reign, a beautiful old residence with numerous relics, was the birthplace of the philanthropist, William Wilberforce, born here in 1759, and has now become the repository of collections illustrating his life, and of the general history of Kingston-upon-Hull. The Pickering Museum is largely devoted to collections illustrating the whaling, fishing, and shipping industries, the nucleus being the specimens collected by a public-spirited citizen, Mr. C. Pickering. Hull is to be congratulated on the activity displayed by its municipality and residents on the establishment of these museums, and the curator, Mr. T. Sheppard, on the valuable series of catalogues issued at a nominal price.

DR. W. S. HUNTER'S "The Delayed Reaction in Animals and Children," affords an interesting contribution to the "Behavior Monograph Series." A release box is employed leading to three different compartments, any one of which can be illuminated by the experimenter. The compartment which is illuminated can be opened and entered by the subject, whereas the other compartments are closed. Food is obtained by entering the illuminated compartment. Rats, dogs, raccoons, and children were used as subjects. After a clear association had been established between the movements leading to food and the light which might appear in any one of the three boxes, experiments were begun in which the light was turned off *before* the subject had made the appropriate reaction. The research consisted in determining the maximal length of this delay-period which is compatible with a correct response, and in ascertaining the psychological factors at work permitting of the correct response after the delay-period. The author lays stress on the importance of what he terms "sensory thought."

THE current number of *The Psychological Review* contains an important paper on association and inhibition, by Prof. J. F. Shepard and Mr. H. M. Fogelsonge, based on the learning of nonsense-syllables. In the first series of experiments these were learnt in pairs, and subsequently the subject was tested by being shown the first syllable of a pair either alone or in different combinations. These combinations of first syllables were either shown successively or simultaneously. Where two first syllables were shown successively, the second was shown at such an interval that the association set up by the former was not already completed in the subject. In a second series of experiments, three, instead of two, syllables were learnt together, and, in testing, the first two of the three syllables were shown simultaneously; these might belong to the same or to different three-syllable groups. In other series of experiments two different syllables were each separately learnt in conjunction with one and the same syllable; the two syllables were subsequently presented successively to the subject when tested. The resulting reproduction-times, as measured by the chronoscope, convince the authors that the inhibition or facilitation thus experimentally produced is one "which cannot be . . . explained neurologically as a division of energy, or drainage." They believe that "an association cannot be explained as a mere path of lowered resistance," but that it "involves other processes which prevent any other stimulus from using the same neuroses at the same time . . . and which block any other association that is tending to operate at the same time, even though both will lead to the same end result."

IN vol. viii., Section D, No. 3. of *The Philippine Journal of Science*, Mr. A. E. W. Salt gives an elaborate account of the endowment provided by Francisco de Carriedo y Peredo, the greatest benefactor of the city of Manila, who died in 1743. From the funds received under his will, a water supply was provided for the city until the American occupation. A new system to supplement the ancient supply was opened in 1908. Water is now brought from an almost virgin watershed of one hundred square miles in area, and thence carried to a storage reservoir with a capacity of 210,000,000 gallons. The city, however, is so rapidly developing that this system is barely adequate to the needs of the population. Mr. Salt has done good service in directing attention to the benevolence of a citizen who, at a time when sanitation occupied little public attention, devoted his wealth to this excellent purpose.

IN Professional Paper No. 79 of the United States Geological Survey, Mr. H. S. Williams discusses the recurrent Tropidoleptus zones of the Upper Devonian in New York. In preparing the data for the Watkins Glen-Catatonk folio (No. 169 Geol. Atlas USUS, Geol. Survey, 1909) the occasional discovery of *Tripedolpetus carinatus* (Conrad) in strata far above the supposed range of the species or of the fauna with which the species is normally associated led the writer to undertake an examination of the sections and sequence of fauna where they appeared. The result throws important light upon the regional geography. The departure and return of the fauna must have been due to diastrophic changes which produced recurring favourable or unfavourable conditions for the existence of the fauna. Those changes of conditions may have resulted from the alternate closing and reopening of an actual passage-way which obstructed or admitted the access of the fauna and of waters favourable to them, or from changes that affected the direction, character, or volume of the existing ocean currents.

THE insect food of Canadian fresh-water fishes forms the subject of an article by Dr. Gordon Hewitt, the Dominion entomologist, published in the fourth annual report of the Commision of [Fish] Conservation of Ottawa. Attention is directed by the author to the futility of attempting to restock depleted rivers, or to introduce new kinds of fish into Canadian rivers, without taking measures to ensure an abundant supply of suitable insect food. In Europe it has been demonstrated that the artificial cultivation of many kinds of insects constituting the chief food of fishes is perfectly practicable; and in many rivers an insect hatchery is almost as necessary and important as a fish-hatchery. Before such insectaria can be introduced with satisfactory results in Canada, a close investigation into the nature of the food of native or introduced fishes is absolutely essential.

A RECENT number of the *Zeitschrift für wissenschaftliche Zoologie* (Bd. cv., Heft 3) is entirely devoted to a memoir on the chemical composition of the hæmolymph of insects and its significance as regards sexual differentiation. According to the author, Herr Kurt Geyer, the hæmolymph in caterpillars and pupæ of Lepidoptera is usually green in females and pale yellow or colourless in males. The green pigment is, as Poulton has already shown, slightly altered chlorophyll in solution, derived from the food-plant; it constitutes a protective coloration, and it is improbable that it has any assimilatory function. The yellow colour of the male hæmolymph is due to the yellow constituents of chlorophyll (xanthophyll). The hæmolymph of non-phytophagous insects shows no such colour difference. When the male and female hæmolymph are mixed a heavy precipitate is at once formed, and this reaction can only be distinguished quantitatively from that which takes place between different species. The author concludes that in insects the entire soma is sexually differentiated in male and female.

DR. C. H. OSTENFELD's account of the biology and distribution of the phytoplankton of Danish seas (De Danske Farvandes Plankton i aarene 1898–1901. Phytoplankton og Protozoer. D. Kgl. Danske, Vidensk. Selsk. Skrifter. 7. Raekke, Naturvidensk og Mathem. Afd. ix. 2. 1913) is of more than local interest. The main work is written in the Danish language, but there is a *résumé* in French, extending to 65 pp., which in itself constitutes one of the best summary accounts which we possess of the present state of our knowledge of the general problems of the biology of plankton organisms. The Danish seas, extending as they do from the Baltic through the deep waters of the Skager Rak to the North Sea, furnish such wide variations in salinity, temperature, and chemical constitution, that they offer exceptional opportunities for studying the effects of physical conditions on the distribution of the plankton, and this aspect of the subject receives a full consideration in the report. A good bibliography will be found on pp. 346–352.

FROM the Kommissionen for Havundersögelser in Copenhagen we have received three further reports dealing with the investigations which have been carried out under the direction of Dr. Johs. Schmidt into the life-histories of eels. These are: Danish researches in the Atlantic and Mediterranean. on the life-history of the freshwater-eel (*Anguilla vulgaris*, Turt.), with notes on other species, by Johs. Schmidt (*Internat. Revue Hydrobiologie und Hydrographie*, 1912); on the identification of murænoid larvæ in their early (preleptocephaline) stages, by Johs. Schmidt (*Meddel. Komm. Havunders. Fiskeri Bd*. iv. 2); and the metamorphosis of elvers as influenced by outward conditions—some experiments, by A. Strubberg (*Meddel. Komm. Havunders. Fiskeri Bd*. iv. 3). In NATURE, vol. lxxxix., pp. 633–636, Dr. Schmidt himself gave a brief account of these researches, and those interested in the subject will no doubt welcome the more detailed reports.

In his presidential address to the Quekett Microscopical Club for this year, Prof. Dendy dealt with the subject of "By-products of Evolution," illustrating his theme by the spicules, more particularly the microscleres of siliceous sponges. After pointing out that these minute spicules exhibit constant specific characters, and have undoubtedly arisen by some process of evolution, since one form leads on to another, just as in the case of any other characters, it is argued that natural selection cannot be directly responsible for their origin, on the ground that the minute differences in the form of the microscleres cannot be of any importance to the sponge in the soft tissues of which they are scattered without order or arrangement. By the principle of correlation non-adaptive characters of this kind may be linked inseparably with other characters which being adaptive, are directly influenced by natural selection, in such a way that any variation in the one must be accompanied by a corresponding variation in the other. Thus, a non-adaptive character may undergo a progressive evolution indirectly controlled by the action of natural selection. The principle of correlation cannot, however, be invoked to explain the specific forms assumed by the microscleres; it can only help to explain why such characters exist at all and why they should undergo progressive evolution. The specific form of the microsclere must be produced by chemical and physical causes involved in, and controlled by, the hereditary constitution of the mother-cell.

Sir F. W. Moore contributes a useful paper on hardy water-lilies to *Irish Gardening* (vol. viii. May, 1913), including not merely cultural hints and lists of species suitable for ponds of different depths, but also some interesting remarks on the general biology and mode of growth of these plants. For instance, the author lays stress on the importance of the study of roots to the gardener; observation of water-lilies shows that from early April to June new roots are developed rapidly as the new leaves and flower-buds are formed and the rhizome elongates, while the older roots largely die away after having served as collectors of food reserves during previous years and as anchors during the winter. It is also noted that while, as a rule, the flowers close on bright days between three and four o'clock in the afternoon, if after noon the day becomes wet and gloomy the flowers usually remain open until dark.

In continuation of his investigations into "Southern Hemisphere Seasonal Correlations" (Nature, August 7), Mr. R. C. Mossman contributed a fourth article to *Symons's Meteorological Magazine* for August. He pointed out an interesting instance of the temporary character of many correlations. The example chosen was the comparison of April to September rainfall at Trinidad (West Indies) with that at Azo (Argentine Republic) for the following six months. Dealing with the fifty years, 1862–1911, it was found that from 1862 to 1877 and from 1895 to 1911 there was no relation between the rainfall of the six-monthly periods; but during the seventeen years 1878–94 the curves showing the rainfall departure from normal are the reverse of each other. The author observes that these results are of importance, as they show that the physical processes that produced a given precipitation at Trinidad during the period under discussion were associated during the six months following by an opposite effect in the south temperate zone, some 2850 geographical miles distant. Mr. Mossman also refers to one or two interesting correlations in other regions, especially one between the rainfall of Java and Trinidad.

The Meteorological Office chart of the North Atlantic and Mediterranean for September (first issue) shows that the last report from the scout-ship *Scotia* was dated August 7 in 54° 45′ N., 49° 30′ W.; no ice in sight. It is pointed out that the full scope and value of the work accomplished cannot be estimated until the reports of the captain and scientific staff have been submitted. The ice notices which may prove to have been of most value are those relating to the comparatively small quantities that have been seen drifting south in the polar current. An important feature this year is the fact that the ice has been held up, for the most part, north of latitude 43°. The special reports above mentioned will, it is thought, no doubt decide whether this was due to abnormal strength of the Gulf Stream, to unusual weakness of the Labrador current, or to both causes.

A circular headed Road Dangers' has been widely circulated by the editor of *The Automotor Journal*. It suggests that the dangers both of vehicular and foot-passenger traffic might be greatly minimised if at crossings the traffic of one street were arbitrarily given a right of way and the traffic of the other street which crosses it were made to go dead slow by a sign that must be obeyed. The writer of the circular considers that not only would the accidents that occur from collisions of vehicles at crossings be greatly reduced, but the noisy use of the horn would be no longer necessary. It is difficult to see how the suggestion can be carried out without some enactment giving to a street authority a power to make bye-laws controlling the traffic in the less important streets and which can be enforced by the police. It would be easy for the Chief Commissioner, through his advisers in Scotland Yard, to decide which streets are to be of primary and which are to be of secondary importance, but short of keeping a constable on traffic duty at every crossing it is difficult to see how, with his existing powers, he can instruct them to summon drivers disobeying notices informing them that they must give way to traffic in the preferred streets.

We have received a copy of the third edition of Merck's "Reagenzien-Verzeichnis." It is a volume of 446 pages, and all the commoner reagents, tests, hardening and preservative fluids, and the like are given alphabetically under authors' names, some 5000 formulæ being thus detailed, with references to the literature. There is further a valuable list of the substances for which the tests are employed, and a similar one for those used in microscopic work. Finally, there is an index of the preparations employed for the various tests, with authors' names attached; thus we find that "arbutin" was recommended by Reichard as a test for nitric acid. The lists are most complete, and so far as we have been able to refer to them are accurate, and are not confined to recent work; *e.g.* Beale's carmine stain and injection fluids are given. The volume will be of the greatest service in the chemical and the biological laboratory.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES FOR SEPTEMBER:—

Sept. 8. 20h. 46m. Jupiter in conjunction with the Moon (Jupiter 4° 56′ N.).
10. 17h. 0m. Saturn at quadrature to the Sun (90° distant).
,, 20h. 0m. Venus in the ascending node.
,, 22h. 14m. Uranus in conjunction with the Moon (Uranus 3° 35′ N.).
14. 20h. 0m. Juno in conjunction with the Moon (Juno 0° 20′ N.).
15. 0h. 48m. Moon eclipsed, invisible at Greenwich.
16. 3h. 0m. Mercury in superior conjunction with the Sun.
22. 4h. 2m. Saturn in conjunction with the Moon (Saturn 6° 59′ S.).
23. 3h. 53m. Sun enters Sign of Libra; autumn commences.
,, 8h. 22m. Mars in conjunction with the Moon (Mars 5° 6′ S.).
25. 0h. 7m. Neptune in conjunction with the Moon (Neptune 5° 0′ S.).
27. 8h. 34m. Venus in conjunction with the Moon (Venus 1° 21′ S.).
29. 16h. 46m. Sun eclipsed, invisible at Greenwich.
30. 12h. 0m. Saturn stationary.
,, 13h. 2m. Mercury in conjunction with the Moon (Mercury 2° 36′ N.).

THE SPECTRA OF THE STARS.—After many years of patient labour by such pioneers as Rutherfurd, Secchi, Huggins, Vogel, Pickering and his co-workers, Lockyer and McClean, the subject of stellar spectra has attracted during the last decade the attention of an ever-increasing number of students in astronomy, astrophysics, physics, and chemistry. This is no doubt thanks in a great measure to the enormous number of spectra classified in connection with the Draper catalogue, but also largely to the simple nomenclature developed by Miss A. J. Cannon, further simplified by the suggestions of Dr. Hertzsprung. Although classification merely has received a great amount of attention of recent years, perhaps partly due to the prominence given to the matter by the Solar Union making it the work of a special committee, yet many important pieces of work have been accomplished beyond. Such are Campbell's and Kapteyn's work on the relations between radial velocities and type of spectrum, the similar work of Lewis Boss on the relation between proper motion and type, the work of Pickering and others on the distribution of stars of particular type of spectrum with reference to the Milky Way, &c. It is perhaps fitting that the importance of the subject should have led to the publication of a summary in the Memoirs of the Society of Italian Spectroscopists, No. 6, from the pen of Signor G. Abetti. It is, however, passing strange that this writer makes no mention of the work of Rutherfurd, Huggins, Lockyer, or McClean, except perhaps that some of them may be referred to in an "&c." Signor Abetti does not deal at all adequately with the literature on the chemical constitution of the stars. He does state, however, that titanium stars are on a level nearer to the helium stars than are the iron stars—a statement for which we know no justification.

EXHIBITION OF THE ROYAL PHOTOGRAPHIC SOCIETY.

THE Royal Photographic Society's annual exhibition at the Gallery of the Royal Society of British Artists, Suffolk Street, Haymarket, is well worth a visit by anyone interested in photography and its applications before it closes on October 4. Besides an excellent collection of works that are notable for their pictorial quality, and that will be examined by technicians as illustrations of the possibilities of the processes that they represent, there is a larger than usual number of colour transparencies, and also exhibits that are of specially scientific interest. The colour transparencies are chiefly autochromes, but there are many on the new Paget plate and a few "Dufays," both of which latter will quite well bear comparison with the autochromes for the quality of their colour and detail. In the scientific section, Lt.-Col. J. W. Gifford shows a large number of original photographs of spectra of the metals taken with a quartz optical train of large aperture. Mr. G. Reboul shows that cuprous chloride, produced by exposing a polished copper plate to chlorine gas, will furnish photographs by treatment somewhat similar to that employed in the production of daguerreotypes. The insecurity of intaglio plate printing for monetary documents is again demonstrated by Mr. A. E. Bawtree in his copies of stamps, the genuine stamp and the forgeries being indistinguishable. The photo-micrographic section is particularly strong. The method of discovering a difference in the colloids present in jams, and of detecting various adulterations, is excellently shown in a series of low-power photo-micrographs by Mr. E. Marriage. Of other series, the "Histology of the Optic Nerve of Sheep," by Mr. J. T. Holder; the "Corpuscular Elements of Human Blood," by Dr. D. H. Hutchinson; and Mr. J. M. Offord's "Diatoms under High Power," deserve special notice. There is a fine collection of radiographs by Dr. Bela Alexander, Dr. G. H. Rodman, Dr. Gilbert Scott, Dr. Robert Knox, and Dr. Thurstan Holland, some taken in a small fraction of a second. In this direction the most novel work is by M. Pierre Goby, who by the use of ultrasoft rays secures quite full details in the most delicate transparent membranes, such as insects' wings, at the same time as showing the internal structure of the insect. But more wonderful are his micro-radiographs, made by using the fine pencil of Röntgen rays that passes through a small hole in a lead screen. The detail in parts of small vertebrates only a fraction of an inch in length, is so well reproduced that a fifteen or seventeen times enlargement would be considered excellently sharp for a direct radiograph. M. Goby applies his method to foraminifera and other minute objects with similar success. Among the other exhibits there are a process with examples of a method of producing colour transparencies by the absorption of dyes in fish-glue, by Mr. Bawtree, and good collections of natural history photographs, lantern slides, and stereoscopic transparencies.

THE ARCHÆOLOGICAL INVESTIGATIONS IN THE MISSISSIPPI REGION.[1]

IN the publication referred to below Mr. Clarence B. Moore gives us another of his very careful descriptions of the systematic excavations he is undertaking in the Mississippi valley, and, as usual, it is profusely illustrated with most excellent photographs and coloured plates. By these investigations and the superb way in which he publishes his results, Mr. Moore is laying a sure foundation for future general-

[1] "Some Aboriginal Sites on Red River." By Clarence B. Moore. Journ. Acad. Nat. Sci., Philadelphia, xiv., 1912.